

COMMUNAL WINTERING OF A SANDHILL CRANE WITH JAPANESE CRANES IN HOKKAIDO, JAPAN

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IN the course of my ecological studies on the Japanese Crane, a Sandhill Crane (*Grus canadensis*) was found 18 January 1970 at Shimo-setsuri, Tsurui village, Kushiro district, Hokkaido, Japan, feeding with many Japanese Cranes (*Grus japonensis*) in a field where food was scattered for the cranes. This is the first record from Hokkaido, and the second for Japan, of this Nearctic species. This paper deals with observations made on the behavior and relationship of these two species, supplemented by additional records made by the people who daily feed grain to the birds.

COLORATION OF THE INDIVIDUAL OBSERVED

The plumage coloration of this Sandhill Crane changed gradually during the winter as follows:

The head was still feathered in February. The forehead and lores became slightly bald in early April and more redness appeared in early May but was definitely not as pronounced as in adults. The chin and malar regions were more whitish than the sides of the neck. In February the back feathers had dark rachises, were gray, tipped with tawny. In April they appeared to be neutral gray without the tawny tips. However, most wing coverts retained tawny-colored tips up to early May. The abdomen was somewhat paler than the breast. The primaries were dark.

The coloration in early February generally was similar to that of a hand-reared bird of about three months of age described by Walkinshaw (1949:16-20), but molting and the acquisition of the red forehead appeared about six months later. The red generally begins to appear during the first fall in some Sandhill Cranes but may not develop until spring with some others (Walkinshaw, pers. comm.). The redness or baldness of the foreheads of the Japanese Crane often is variable even among synchronously hatched individuals (Masatomi, unpubl.).

The exposed culmen was blacker than those of the Japanese Cranes, but the basal half of the lower mandible was pale gray-olive. The entire bill and especially the lower mandible gradually became lighter colored. The legs were dark greenish-black or nearly black. The eyes were hazel.

ROOSTING AND FEEDING RANGE

It is not certain just when this bird arrived. In late September or early October 1969, one of the regular feeders of the Japanese Cranes noted a strange smaller dark crane feeding with four Japanese Cranes at Naka-setsuri, about 20 km north of Kushiro city (Figure 1.A). This was probably the first observation. In late November this Sandhill moved to Shimo-setsuri, 7 to 8 km south of the first location. Here many Japanese Cranes, stay in small

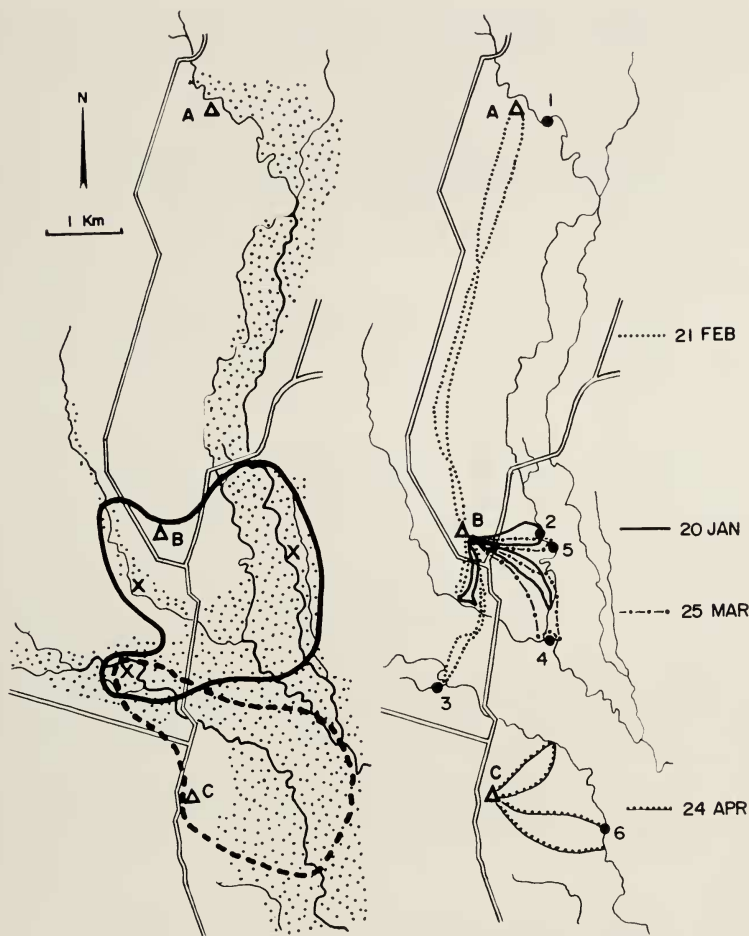


FIG. 1. (Left) Feeding ranges of flocks of Japanese Cranes in January to March (solid line) and in April (dotted one). X: roosting places used by the majority of Japanese Cranes wintering in this area. (Right) Some of the feeding ranges of the Sandhill Crane. Various lines show the Sandhill Crane's flight routes on each day. Circular dots: roosting points. Numbers given to each roosting point: change of settlements, 1. October, 2. January, 3. February, 4-5. March, and 6. April.

groups during the colder part of winter (Figure 1,B). After that the Sandhill Crane fed at Watanabe's feeding place at Shimo-setsuri, eating corn every day, until 17 April 1970 when it suddenly appeared at Narukawa's feeding place at Shimo-hororo, 3.5 km south of the second place (Figure 1,C). It arrived at this place at least once daily from then until 6 May. A similar bird seemed to be observed in May on the opposite side of the marsh, about 14

TABLE I
FIRST ARRIVAL AND LAST DEPARTURE AT SHIMO-SETSURI FEEDING PLACE

Time	Arrival					Temperature °C	W.D.	Lux
	Sunrise	J.N.	M.M.	D.F.	Weather			
18 Jan	—	—	—	—	—	—	—	—
19 Jan	—	—	—	—	—	—	—	—
20 Jan	09:40 (08:48) ¹	47	53	E	Cloudy	-6.5	N-1	8,500
22 Jan	10:35 (09:20)	34	54	E	Clear	-6.8	W-1	57,000
21 Feb	13:43 (09:35)	0	—	S	Clear	4.8	WNW-4	74,000
22 Feb	10:48 (09:50)	30	49	S	Cloudy	-4.0	S-1	62,000
11 Mar	14:30 (09:05)	2	—	E	Clear	2.8	S-2	102,000
24 Mar	08:32 (06:55)	27	33	E	Cloudy	-1.2	S-1	72,000
25 Mar	07:37 (06:50)	28	32	E	Clear	-8.0	NW-2	19,000
5 Apr	—	—	—	—	—	—	—	—
8 ² Apr	— (14:10)	0	—	—	Clear	5.8	NW-5	95,000
17 Apr	—	—	—	—	—	—	—	—
24 ³ Apr	—	—	—	—	—	—	—	—

Abbreviated head means: J.N.: Number of the Japanese Cranes aggregating before the Sandhill's arrival. M.M.: Maximum number of the Japanese Cranes gathered temporarily in the morning. R.N.: Number of the Japanese Cranes remaining behind after the Sandhill's departure. M.A.: Maximum number of the Japanese Cranes at pre-roosting assembly in the afternoon. D.F.: Direction of flight (W-E; at first west, then eastward). W.D.: Direction and degree of wind.

¹ Time in parentheses shows the first arrival and the last departure of the Japanese Cranes in flock.

² The record of Japanese Cranes, the Sandhill Crane not seen anywhere.

³ At Shimo-hororo feeding place.

TABLE 1 Continued

	Time	Sunset	Departure				Weather	Temperature °C	W.D.	Lux
			R.N.	M.A.	D.F.					
18 Jan	16:27 (16:34)	16:15	2	53	E	Cloudy	-3.0	NW-1	55	
19 Jan	16:30 (16:50)	16:16	18	33	E	Clear	-5.0	E-1	55	
20 Jan	16:23 (16:48)	16:17	48	56	E	Cloudy	-3.3	E-2	95	
22 Jan	16:38 (16:50)	16:20	22	46	W-E	Clear	-3.0	W-2	40	
21 Feb	17:34 (17:42)	17:00	11	46	E-S	Clear	-3.8	E-1	10	
22 Feb	17:23 (17:43)	17:01	16	45	SE	Clear	-7.0	NW-1	17	
11 Mar	17:50 (—)	17:22	0	37	SE	Cloudy	-3.2	NE-1	5	
24 Mar	18:11 (18:19)	17:37	11	37	E	Cloudy	-3.0	S-0	0	
25 Mar	17:46 (18:05)	17:38	9	25	E	Snow	-4.7	NE-1	190	
5 Apr	18:13 (—)	17:51	0	8	SE	Clear	-0.8	S-1	—	
8 Apr	— (16:06)	17:55	—	2	W	Cloudy	4.2	NW-4	3,500	
17 Apr	18:00 (—)	18:05	—	4	—	Rain (Foggy)	—	S-1	—	
24 Apr	18:20 (—)	18:13	0	7	SSE	Clear	4.8	SE-1	145	

km east of Shimo-hororo. Thus this Sandhill Crane wintered in marginal regions of the Kushiro Marsh from early October 1969 until early May 1970, changing feeding regions at least twice.

As it changed its feeding regions, it also roosted in several different points along the Setsuri and Hororo rivers (Figure 1). Since the river never froze in many places, it was possible for the bird to feed in the river during the early mornings prior to its appearance at the feeding places. It also fed there on some evenings after returning. This bird roosted apart from the communal roosting region used by the majority of the Japanese Cranes, sometimes for several weeks or more, but often a pair of Japanese Cranes with their young will do the same. The Sandhill became affiliated with one of these groups and remained apart from the main group.

Because of the unusually deep snow at Shimo-setsuri (about 60 cm on 21 February, compared with 30 cm during normal years) the fields were snow-covered until mid-April. But the Setsuri River, 2 to 3.5 m wide at the roosting points did not freeze even in the coldest months (-20° C in February). The river here is shallow, wide and has embankments. The food of the Sandhill Crane was not known but some edible roots and rootlets as well as green parsley (*Oenanthe stolonifera*) and sticklebacks (*Pungitius pungitius*) were available in addition to the corn on the feeding stations.

DAILY ACTIVITIES AT FEEDING PLACES

Every morning at the night roost, the Sandhill searched for food or preened. Then when its adopted "family" of two adult and two young Japanese Cranes flew from the night roost, it joined them. Although it did not always go to the feeding stations in the very early morning it appeared there at least once daily during the winter. Records of earliest daily arrival and latest daily departure at the feeding regions are given in Table 1. The chronological sequence of its activities at Shimo-setsuri, on several different days are given in Figure 2.

On 25 March 1970 there had been a snowfall of 1 cm the previous night. The sky was clear, temperature -11.4° C at 07:00. Two Japanese Cranes flew from the Ashibetsu River to Shimo-setsuri feeding station at 06:50. Between then and 08:00, 32 Japanese Cranes, including five young of the year, assembled there, one after another. The Sandhill came from the east with its "family," landed, and fed for awhile. When nine Japanese Cranes came to the feeding place, the male of the "family," showed a threatening posture against them. The "family" gradually moved away 150 m eastward on foot. Sometimes the Sandhill rested, preened, fed, yawned, stretched its wings and legs, fluffed its feathers but then remained inactive until 09:55. At 09:59 the "family" flew to the region near the Setsuri River where they foraged. Heavy snow fell between 13:40 and 15:10. At 15:50 the birds came flying back in the following order- male-female-young-Sandhill-young.

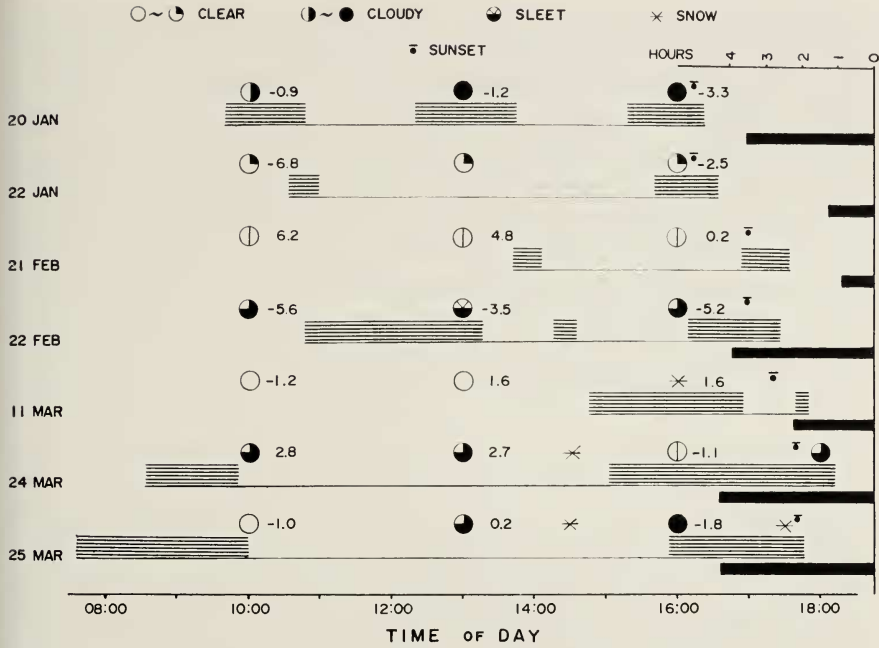


FIG. 2. Chronological sequence of the Sandhill Crane at Shimo-setsuri feeding place. Horizontal hatching: stay at feeding place. Number at each weather mark is temperature (°C). Histogram at right shows the total duration of stay at feeding place.

Approaching the feeding station, they landed then, walked the last short distance where they fed on corn. Later they sauntered to the east end of the field, preened, and rested. Later they joined other cranes and all began to dance, chasing each other, jumping high into the air. The Sandhill did not dance, but rested and watched nearby. At 16:55 all birds went to the west side of the field where much corn had been scattered. The Sandhill began feeding at 17:10, then rested, standing on one leg. Heavy snow fell again from 17:20 to 17:40. At 17:46 the male of the "family" group flew to the roosting ground, followed by the three members of his family. The Sandhill was feeding so eagerly, that it did not notice they had departed for a moment. But soon it took off after them.

The flight order was variable. Sometimes the Sandhill was in the center, sometimes behind. Excluding several double trips to Naka-setsuri from the Shimo-setsuri feeding place, its daily feeding ranged little as shown in Figure 1. Most of the Japanese Cranes gathered at the Shimo-setsuri feeding station, flew southwest or west to drink or to rummage out food along the Ashibetsu River, but the "family" seldom flew to the region. Therefore, the feeding range of the Sandhill in Figure 1 is identical with that of the "family," during January, February, and March, and of the young when they were chased away by their parents in early April.

At the earliest arrival each morning a photometer registered between 8,500 and 72,000 lx and at evening departure time registered under 190 lxs. But as spring approached, the Sandhill came earlier and remained later. The temperature at departure time was between -3° C and -7° C between January and March (Table 1). The morning departure seemed later than that recorded during the same months by Walkinshaw (1949:36-42) at Roswell, New Mexico but this was probably because of lower temperatures at Shimo-setsuri. Japanese Cranes tend to waste much time on the roosting place after sunrise during severe cold mornings (Masatomi, unpubl.). The time of evening arrival on the roosting region in January varied little from Walkinshaw's observations. The Sandhill usually joined the "family" directly on the roosting spot, after sunset. (The sun set 20 minutes earlier behind the west ridge than official sunset.)

RELATIONS WITH JAPANESE CRANES

Relation with the "family" members.—The Sandhill relationship with the "family" members can best be described in three stages:

a) Formation of interspecific association: How the Sandhill joined with this family of *G. japonensis* consisting of a pair and their two young cannot be explained. When it was first observed, it already was with the group at Naka-setsuri, so it apparently joined them even in September or early October. Unfortunately it was considered to be an undergrown young *japonensis* or a Gray Heron (*Ardea cinerea*) until I encountered it on 18 January 1970. Japanese Cranes are considered as residents in Hokkaido but there may be a movement of some birds between Kushiro and Nemuro. It is thus not completely impossible that the Sandhill met the family while migrating westward in Nemuro, but this is probably only conjecture.

b) Maintenance of the relationship with a definite "family": The Sandhill associated with the "family" of the Japanese Crane in all activities—roosting, feeding, flying, resting, etc. until 7 April. Nevertheless, it seemed that they, especially the parents, did not treat the Sandhill as a genuine member or young of the family, no matter how rarely they turned on it by a threatening posture, by chasing or other hostile activities. If it was threatened or chased, the same as their own young, the male responded by counterattacks against the attacking bird. Some birds approached it with light threatening posture and were immediately attacked by one of the "family" adults, but it was difficult to distinguish between these attacks and weak aggressions frequently expressed only to maintain interindividual distance or to defend a good feeding spot.

The parents never flew without their youngsters until the new breeding season approached, but the Sandhill was sometimes tardy as described above.

It also separated several times from the "family" during February and March. At the Shimo-setsuri feeding station, the members, especially the male, of the "family" occasionally approached the Sandhill with or without, light threatening postures, and the latter always withdrew. Such approach-avoidance, however, was not restricted for it was rather common between *G. japonensis* in a feeding flock. Although generally *G. canadensis* avoided *G. japonensis*, one young jumped aside two or three meters with half-spread wings when the former approached it with light threatening posture on 22 February. The male of the "family" approached in threatening posture toward the Sandhill in late March. The Sandhill ran away with the first threat, but I never saw the male attack the Sandhill as he did his own young when the breakdown of family ties was made in late March and early April.

c) Relationship with the post-juveniles driven away by the parents: According to the feeders, the "family" came on 7 April to the Shimo-setsuri feeding station at 11:00. Later, only the Sandhill, fed between 14:00 and 17:00. The next day I found only two adults there and after 9 April, three young, (i.e. the Sandhill, and two Japanese Cranes.) They came once or twice daily. Young *G. japonensis* sometimes danced, facing each other on the feeding grounds after March and the Sandhill joined in these dances, somewhat different from the regular courtship display, in April. On 17 April, during the afternoon, after two young Japanese Cranes had been dancing, the three young of the "family" began dancing after they had eaten. They bowed, bounced up and down, stabbed the ground, ran about flapping their wings, all in one section of the feeding region which still was covered with patches of snow. The Sandhill danced very similarly to *G. japonensis*, either with the young birds or alone. It stabbed the ground, at times picked up objects which it threw into the air. After bowing once or more it bounced 30 to 50 cm into the air, but not as high as described by Walkinshaw (1949:32-36), with legs held stiffly, and wings flapping. When it danced with young Japanese Cranes, it bowed repeatedly, tried to attack one of them, then they both jumped into the air facing each other similar to comrades of *japonensis*.

At the third feeding station such a dance was observed until early May when the three began separating. Often, each flew alone, so that it was impossible to differentiate the "family" young from others also abandoned by their parents. All young of the year often assembled into a temporary flock immediately after being abandoned. On 3 May the Sandhill took off with two Japanese Cranes for the roosting site and four days later it disappeared.

Relations with other Cranes.—Japanese Cranes forming the winter flock seemed to take no special interest in the Sandhill. They were not familiar neighbors, nor were they strong opponents. But when foraging over the feeding grounds, during the colder months, the Sandhill usually avoided them.

especially when they approached him. In contrast, however, they often showed decisive resistance against other neighbors who drew too near when they were eating. The Sandhill stretched its neck forward, pointing its bill against the other bird and called a shrill *Bui-puy-puy-puy-puy-puy*. It then raised its body, stood in an upright position, and by this posture caused the other birds to retreat hastily away. A similar behavior was observed the next day when the bird stood in nearly erect posture, and called *Gui-puy-puy-puy-puy-puy* toward a Japanese Crane which passed slowly alongside it. The *japonensis* was startled slightly. A few approaches and more avoidances were observed in April. The Sandhill became much more self-reliant at this time.

On 24 March the Sandhill leaped half-heartedly three times into the air as if fleeing from two year-old opponents who began dancing in the flock. Occasionally he danced with young *japonensis* at the third feeding ground, but it was uncertain whether they were its former "family" mates or not.

DISCUSSION

Although a specimen of *Grus canadensis*, without date and locality was described from Japan by Temminck and Schlegel (1849:117-118) as *la grue commune a long bec* (*G. cinerea longirostris*), this record was not adopted in any authoritative list of Japanese birds (such as Austin and Kuroda, 1953; Ornithol. Soc. Japan, 1958) because of the poor data of the specimen (cf. footnote in the latter paper).

There was no record of this species for over 100 years until Takano (1964) unexpectedly found a Sandhill Crane wintering with White-naped Cranes (*Grus vipio*) and Hooded Cranes (*G. monacha*) at Arasaki, Kagoshima, Kyushu on 9 December 1963. This crane was an adult, but of unknown age. It remained there from 10 November 1963 until 26 February 1964.

Although the present case is the first Hokkaido record, the bird may have wandered in more often and was mistaken for a heron, a small Japanese Crane or a Common Crane (*G. grus*).

Several color slides taken by me were examined by Walkinshaw. He wrote "This bird from its size, very short bill and tarsi, must be a Lesser Sandhill Crane (*G. c. canadensis*) . . ." The Kyushu bird was similar to the one in Hokkaido but its subspecific identity was not determined.

According to Takano (1964) the Sandhill at Arasaki always moved in association with *G. vipio*, a larger species. But it often drove away *G. monacha* which is much more like it in size and color, when they accidentally approached it. Moreover, even in flocks of *G. vipio* it was alone and often pecked at by *vipio* (Ogasawara, 1970:7). On the other hand the 1970 Sandhill always behaved as though it were a member of the "family" of *japonensis* and its activities were synchronized with the movements of this family. It might be

in the category stated by Rand (1954) as "casual associations of no benefit," but the Sandhill probably received benefits from *japonensis* by joining them on both roosting and feeding regions.

In appearance the "family" adopted the young Sandhill Crane as their member but apparently, from their behavior, not as a genuine member. They were indifferent to it but tolerated it and showed no definite hostility towards it. Yet, in late March and early April they acted as though it was a stranger. Leadership of the group was retained in all cases by *G. japonensis*, chiefly the male. Hence the association must have been made and maintained by the Sandhill from the tendency for intense gregariousness of the species. The tendency of some birds to associate with, and be tolerated by birds larger than they, in non-breeding flocks is not uncommon. For instance, several sandpipers (Nichols, 1931), Bean Geese (*Anser fabalis*) with White-naped Cranes (Shimomura, 1955), and a Sandhill Crane with White-naped Cranes (Takano, op. cit.).

The Sandhill Crane that wandered into Kyushu did not associate with *G. vipio* as intensely as did the bird in Hokkaido did with *G. japonensis*, but the difference may have been because of the difference in ages. The bird in Kyushu was not a bird of the year as was the one in Hokkaido. The Whooping Crane (*G. americana*), very similar in size to *G. japonensis*, does not tolerate spoonbills, herons, or egrets within several hundred yards of the nest location while these birds are tolerated in established territories in winter although Sandhill Cranes are not (Allen, 1952:145, 188-191). However, at times Sandhill and Whooping Cranes gathered at fresh water on Aransas Refuge without indications of fighting at all. On the other hand *G. japonensis* pays no marked attention to other birds on either winter or summer territories, except birds of prey. Eastern Gray Herons (*Ardea cinerea jouyi*), Whooper Swans (*Cygnus cygnus*), and other birds forage or roost within the same territory of *G. japonensis* (Masatomi, 1970). Emlen (1952) pointed out that the form characteristics of homogeneous bird flocks were determined by the interplay of positive and negative forces associated with gregariousness and intolerance. Such tolerance (as described above) of the Japanese Cranes might be one of the causes which made unusual association between two different species possible.

The Sandhill Crane stayed longer in Hokkaido than did the one in Kyushu. Possibly because Kushiro is 1,300 km northeast from Arasaki. Since this Nearctic species breeds in northeastern Siberia, it was once recorded on 20 May on Commander Islands and observed at Nizhne-Kamchatsk in Kamchatka (Dement'ev et al., 1969:133-134) indicating possible migration of Asiatic stragglers.

SUMMARY

A young-of-the-year Sandhill Crane (*Grus canadensis* probably *canadensis*) wintered with a "family" of Japanese Cranes (*G. japonensis*) consisting of a pair and two young, near Kushiro, Hokkaido, Japan. The group formed part of a wintering flock of the latter species. This is the second record of this species for Japan, the first for Hokkaido.

The Sandhill and its associated "family" of Japanese Cranes changed their feeding range twice or more during the winter, and correspondingly changed their roosting sites.

In the spring, when the family broke down, the Sandhill associated with the two young. At times it danced lightly with them. Some behavioral associations between the family and the Sandhill or its relationship with others in the flock are given and discussed briefly. The attitude of the "family" and other cranes was generally indifferent to it. Therefore, the formation and maintenance of this association depended on the Sandhill's positive attachment to the "family" and the general tolerance of *G. japonensis* to smaller birds. But the actual process of attachment and time of arrival were not known.

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